

## WEIGHT LIFTING INJURIES – LOW BACK/MISCELLANEOUS

### Background

1. Definition: Injuries that occur during weight lifting
2. Weight lifting injuries usually due to:
  - Improper technique
  - Use of anabolic steroids
  - Improper warm up
  - Immature skeletal system
  - Attempting too much weight too quickly
3. Two categories of injury
  - Acute/traumatic
  - Gradual onset
4. Web sites:
  - American Academy of Pediatrics Policy Statement: Strength Training by Children and Adolescents:  
<http://aappolicy.aappublications.org/cgi/reprint/pediatrics;121/4/835.pdf>
  - National Strength and Conditioning Association (NSCA):<http://www.nscalift.org/>

### Pathophysiology

1. The most common injuries seen in weight lifting:
  - Sprains, strains, tendon avulsions, compartment syndrome, overuse syndrome

### Incidence/Prevalence:

1. 2.6 injuries per 1000 hours of activity
  - Most common:
    - Low back pain-rate of 0.43 per 1000 hours of activity
    - Shoulder injuries-rate of 0.42 per 1000 hours of activity
  - Risk factors:
    - Improper weight lifting exercises
    - Using too much weight
    - Poor technique
    - Pushing beyond limits/losing control of weight equipment

### Morbidity/Mortality:

1. Mostly self-limited
2. Patients usually respond to conservative treatment

### I. Low back strain:

- Partial or complete tear of the muscle-tendon unit
- Usually caused by violent muscle contraction during excessively forceful muscle stretch
- May involve any posterior spinal muscle/associated tendon
- Muscles that span several joints are most susceptible
- Body weight and weight equipment can generate powerful forces

1. Risk factors:
  - Excessive low back curvature
  - Forward tilted pelvis
  - Weak back and/or abdominal muscles
  - Tight hamstrings
2. Epidemiology
  - 7-13% of all sports injuries in intercollegiate athletes are low back injuries
    - Muscle strains most common
    - More injuries during practice (80%) versus competition (6%)
3. Signs/Symptoms
  - Sudden lower back pain
    - Spasms/severe pain in lower back
    - Complaint that lower back is sore to touch
    - Complaints usually localized over posterior lumbar spinal muscles
      - Lateral to spinous process insertion of muscle at iliac crest
  - May have decreased range of motion/pain especially with flexion
  - Absence of:
    - Structural deformities
    - Generalized mid-back pain
      - May indicate disc pathology
    - Neurologic symptoms
4. Physical examination
  - Initial exam standing
    - Evaluate for deformities
    - Changes in alignment
    - Difficulty in changing position
    - Full or limited range of motion
  - Palpation-perform prone
    - Evaluate for muscle spasm
    - Location of point tenderness
    - Point specific pain midline may indicate ligamentous injury or interspinous bursitis (kissing spines)
5. Neurologic exam
  - Motor and sensory exam
  - Reflex testing at knees/ankles
  - Straight leg raise test
  - Evaluate for disc involvement, sciatica, neurologic involvement
    - Negative Patrick or FABER test (indicates sacroiliac involvement)
      - Screening test for pathology of hip or sacrum
        - Place patient in supine position
        - Flex leg and put foot of tested leg on opposite knee
        - Motion is **F**lexion, **A**Bduction, **E**xternal **R**otation at hip
        - Slowly press down on superior aspect of tested knee joint lowering leg into further abduction

- Test is positive if there is pain at the hip or sacral joint, or if leg cannot lower to point of being parallel to opposite leg
- 6. Diagnosis-usually confirmed by history and physical
- 7. Standard AP and lateral radiographs can be used to:
  - Exclude fracture
  - Evaluate for rheumatic disease
  - Evaluate for tumor
  - Evaluate for degenerative joint disease
  - Evaluate spinal alignment
- 8. Additional imaging
  - If no response to conservative treatment or if develops neurologic signs:
    - MRI is preferred over CT scan for better visualization of soft tissue and absence of radiation exposure <sup>[1, 2, 3]</sup>
- 9. Treatment
  - Acute phase
    - Maintain some activity-results in more rapid functional recovery
    - Avoid weightlifting while pain persists
    - Manipulation not recommended during acute phase
    - Cold therapy-up to 48 hours
    - NSAIDS to help control pain
      - Short term use
      - Use longer than 3-6 months may result in GI bleeding/ulcers
    - Physical therapy
      - May include electrical stimulation
    - Muscle relaxants
      - May help with spasm/facilitate light physical therapy
      - Do not shorten or alter course of injury
    - Lightweight lumbosacral corset
      - Consider for muscle spasms
      - Discontinue as soon as spasms resolve
    - Instruct patient in proper body mechanics
  - Recovery phase
    - Physical Therapy
      - Abdominal / paraspinal muscle stretching/strengthening
      - Other modalities
        - Heat
        - Ice
        - Ultrasound
        - Electrical stimulation
        - Soft tissue massage
  - Recreational Therapy
    - Maintain an upright posture of the spine in everyday life
  - Surgical Intervention
    - Generally not necessary

- Consultations
    - Rheumatology
    - Spine surgery
  - Other treatment :
    - Light muscle massage
    - Chiropractic manipulations
      - IM injections:
        - Trigger points injections controversial
        - Limited research
  - Maintenance Phase
    - Physical therapy program
      - Initial focus on pain, muscle strength, muscle groups shortening
      - Adjust in every session according to progress
      - Implemented phase for 1-2 weeks to several months
10. Prognosis:
- 90% improve within 6 weeks even if no treatment
  - 10% develop chronic lumbosacral pain without treatment
11. Prevention:
- Education regarding proper warm-up exercises
  - Proper stretching exercises
  - Correct weight-lifting techniques
  - Upright posture while the patient is standing, sitting, lifting
  - Lumbosacral muscle corset
  - Exercises including or emphasizing proprioceptive activities
    - Swiss ball
12. Return to play
- Symptoms usually decrease after 3 days
  - Most subside between 1-6 weeks
  - Safe return to lifting when pain has resolved discomfort
  - Return on pain medication not recommended

## II. Degenerative disease of lumbar spine<sup>[4, 5, 6]</sup>

- Seen in sports that are stressful on spine such as weight lifting
  - Evidence of disc injury is common
  - Appears earlier than expected
  - Intensive weight training with repetitive axial loading accelerates degeneration process
  - Three forms of Lumbar disc disease in athletes:
    - Disc rupture
    - Spondylolysis
    - Lumbar stenosis
1. Epidemiology
- Age < 18 years
    - Fewer than 10% have athletic-related lumbar spine injury
  - By age 30 disc herniation becomes more common

- By age 40
  - 80% of male lifters demonstrate evidence of compression fracture
- 2. Signs and symptoms:
  - Begins during heavy weight training
  - Accumulation of multiple smaller injuries
  - Classic findings of disc herniation including back and unilateral leg /hip pain
  - Neurological/radicular findings on examination
  - Back pain, mild stiffness and spasm without radicular symptoms
  - Straight leg raising test is often not strikingly positive
  - Motor deficits may be difficult to elicit
  - Often mimic an arthritic process with many episodes of back discomfort
  - Episodes of lower back pain episodes with unilateral or midline pain and spasm involving hips or thighs.
- 3. Diagnosis:
  - Plain films of lumbar spine
  - SPECT scans
  - Plain CT
  - MRI
  - Myelography
  - Post myelography CT
  - Electromyography/ Nerve conduction velocity studies
- 4. Treatment
  - Goals
    - Maintain athlete's safety
    - Return to competition as soon as safely possible
  - Initial severe back/radicular pain
    - Relative rest
    - Analgesics including NSAIDs
    - Muscle relaxants
  - Milder presentations
    - Restriction of heavy exertional activity
    - Mild analgesics
    - Period of time away from practice or competition
    - Gradual increase in weight training
  - Continued symptoms
    - Consider surgery referral if indicated
- 5. Complications
  - Spinal shrinkage
  - Ruptured lumbar disc
  - Spondylosis

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### III. Miscellaneous injuries

1. Spontaneous pneumothorax <sup>[36,37]</sup>
2. Sport hernia (Gilmore groin) <sup>[34]</sup>
3. Hamstring Strain <sup>[38]</sup>
4. Umbilical and Bilateral Inguinal Hernia <sup>[35]</sup>

### Other rare conditions reported while weight lifting:

1. Spontaneous Spinal Epidural Hematoma
2. Spontaneous tetraplegia during weight training
3. Syringomyelia associated with heavy weightlifting
4. Blood lipid peroxides and muscle damage increased following intensive resistance training of female weightlifters
5. Episodic snapping of the medial head of the triceps
6. Delayed diaphragmatic herniation masquerading
7. Spontaneous shaft fracture of the tibia in weightlifting

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